



Chapter II

Media Content Management

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The production of multimedia content has grown overwhelmingly in recent years due to decreasing hardware costs, inexpensive storage and ubiquitous high-bandwidth networks. In addition, the introduction of digital video is completely changing the landscape of the entire video value chain. The easy access and increased availability of multimedia is posing new challenges to manage the data. Image and video archives in broadcast studios, corporate archives of multimedia collaborative sessions, video conferencing sessions and educational videos all require tools for quickly locating video segments of desired content with transparent access. The market for such tools, known as media asset-management tools, has been growing rapidly. In this chapter we will discuss the general architecture and the tools for media content management. We will survey some of the techniques that employ methods of data management beyond traditional databases. We will discuss existing research prototypes and some commercially available systems. These systems enable applications that facilitate effective access, interaction, browsing and display of complex and inhomogeneous information consisting of images, video and audio.

INTRODUCTION

Over the last decade the prophecies of ubiquity of digital content have come true. As consumers we have become accustomed to ordering a CD along with our photos; we watch streamed video, although still jerky and not free of artifacts; we download MP3 files and get used to the benefits of a personal video receiver (recorder) or a DVD player. In the corporate world we have video training material, multimedia presentations and the ever-expanding documents and Web pages to organize information from online retailers. Content owners have already started serious initiatives to organize their content. For example, BBC's digital

archive initiative is planning to collect 600,000 hours in digital format. Content owners are looking into defining the right infrastructure and content archive architecture for new content creation, content re-purposing for online and on-demand applications, as well as for more traditional broadcast applications.

For this purpose there are three aspects:

- *Media warehousing:* Preservation of old content where assets are in danger of deteriorating and existing hierarchical storage options are changing. In the archive process re-engineering efforts are needed to derive the benefits of new technology. Format conversion is necessary into formats, which are electronically deliverable.
- *Information access:* Content archiving and authoring tools that take advantage of automatic and manual content abstraction and provide easy access to professional as well as naïve users are necessary. In addition, linking information on content rights management to the items in the archive is essential for wide adoption of the digital archives. Applications that access content archives can have different requirements with respect to the level of content representation, frequency of content updates, tolerance to latency and level of sophistication of search tools.
- *Content delivery:* Creating proprietary and public delivery systems for audio, video and stills is a big challenge especially with the unresolved bandwidth problem in the context of the existing variety of networks. The multimedia content could be stored in a distributed archive and require different access mechanisms and provision for interoperable tools and applications.

In some sense the history is repeating itself. During the emergence of data management systems, many of the storage and access issues were left to application developers. Having all the database management tools available for content management it still seems that the additional tools for indexing and search, access rights, transaction management and buffer management are yet to be fully integrated into the system. Database management systems combine many of the tasks that developers of databases previously had to code themselves, allowing users to ignore such things as how and where the data was stored.

To reuse the same digital content in multiple forms and environments, such as for the Web, CD-ROMs and broadband, we need systems that let a naïve user construct an appropriate multimedia presentation from the appropriate digital assets, i.e., a content management system should let users ignore how and where the data is stored. If a user is interested in finding all digital data concerning a given concept, the system should be capable of finding it for the user. Moreover, it should let the user transparently incorporate the data in a presentation.

However the present tools are still struggling with delivering the content analysis and indexing aspects without fully understanding the context and content semantics. There is an abundance of research work in this area in the past decade. Most of the approaches either apply high level or low level concepts. The automatic approaches which combine low level feature extraction and high level semantics are under development. Meanwhile it became apparent that there is an imminent need for standardization for content description for media management applications. Many standardization organizations that deal with delivery mechanisms and compression of image, audio and video content are involved in certain aspects of describing the video or multimedia data. MPEG-7 is defining a multimedia content description interface, DVB-SI is describing the metadata to be sent along with the digital video broadcast, TVAnytime is describing the metadata for on-demand broadcast applications (MPEG-Requirements-Group, 1998). SDMI on the other hand is defining guidelines for secure audio content distribution and rights management.

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